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GEOGRAPHIC SCHOOL BULLETINS

Published Weekly by

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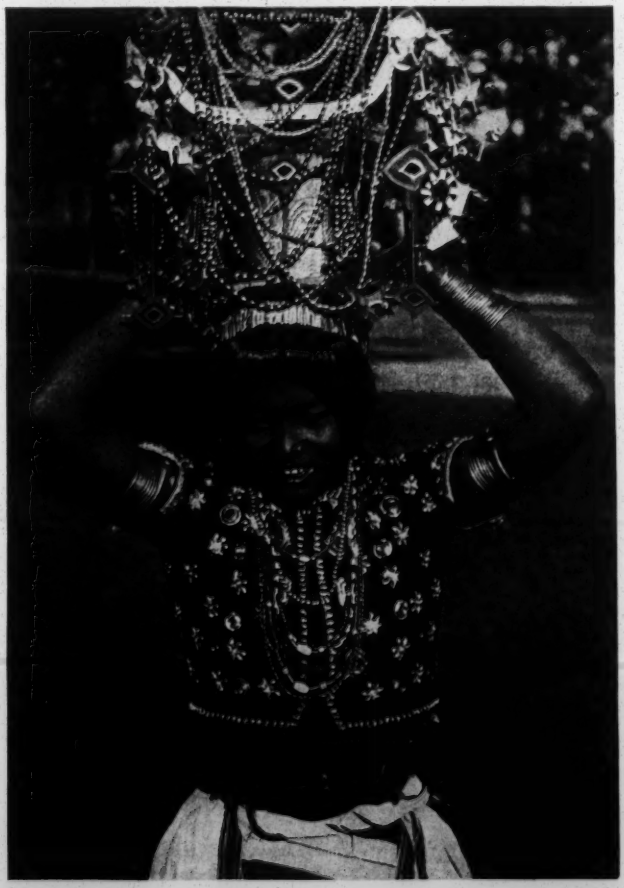

A DANCING DAUGHTER OF A DANCING PEOPLE PERFORMS AN ANNUAL CEREMONY

Exceptionally well dressed for the occasion, this Naga maiden is not too typical of her backward tribe which inhabits the Naga Hills just south of the point where the Ledo Road crosses the border between India and Burma. There are several sub-tribes among the Nagas: some go naked, others are comparatively well covered; some are ugly, others are more pleasing to the eyes of Western judges. All are cheerful and friendly, as evidenced by the fact that they helped the totally strange Yankees build the Ledo Road (Bulletin No. 1). Nagas love music and dancing. They sing as they reap their rice, swinging their sickles in time to the music. When marching along roads, they keep time to a chant which is varied to suit the speed of the march.

G. F. Heaney (Mondiale)

GEOGRAPHIC SCHOOL BULLETIN

HOW TEACHERS MAY OBTAIN THE BULLETINS

The Geographic School Bulletins are published weekly throughout the school year (thirty issues) and will be mailed to teachers in the United States and its possessions for one year upon receipt of 25 cents (stamps or money order); in Canada, 50 cents. Originally entered as second-class matter January 27, 1922; re-entered as of April 27, 1943, Post Office, Washington, D. C., under Act of March 3, 1879. Copyright, 1945, by National Geographic Society, Washington 6, D. C. International copyright secured. All rights reserved. Quedan reservados todos los derechos.

Ledo Road Trucks Break the Siege of China

AMERICAN trucks, breaking the siege of China, are making martial music on the Ledo Road.

Generalissimo Chiang Kai-shek, in announcing the completion of this new Chinese life line, asked that it be named the Stilwell Road in tribute to the United States general (illustration, next page) whose pioneer work made the present highway a possibility.

The first convoy, consisting of about 100 artillery-laden trucks and several jeeps, crossed the Burma-China border on January 28, 1945, at the war-ruined town of Wanting. The small column, a token of larger ones expected to follow, was held up between Bhamo and Namkham while the last Japanese invaders were driven from the part of Burma the road traverses.

"Pick's Pike" Joins with Bhamo Spur of Burma Road

The Ledo Road, named after the town in northeastern India where the railroad from Calcutta and Chittagong stops and the new highway to China begins, is a 1945 counterpart of the 1941 Burma Road. Ledo has taken the place of Lashio, the railhead where the Burma Road began. Lashio is still in Jap hands; so the new Ledo Road joins the old Burma Road near the Chinese border, 62 miles north of Lashio. From there, the original Burma Road is followed through mountainous western China to Kunming and Chungking.

The Ledo Road should be thought of in two sections. The first section, the Ledo Road proper, runs from Ledo, in Assam Province, India, to Myitkyina, in northern Burma. This stretch of highway is about 260 miles long and took two years to build. United States Army Engineers, fond of nicknames, dubbed this section "Pick's Pike" in recognition of their construction boss, Brigadier General Lewis A. Pick.

Yanks stationed along the road also enjoy posting signs, perhaps to make this jungle track seem more like a United States highway. Some of the signs reveal with dry humor the dangers of this "road to hell." Others indicate the G. I.'s idea of the road's importance—"I'm your life line, treat me right."

The second section is the southward-running portion of the artery between Myitkyina and Bhamo. The loop from Bhamo to the Namkham-Wanting border area follows a prewar road which once served as a feeder to the old Burma Road.

A short cut that will make unnecessary the routing of future truck convoys south to Bhamo is under construction. This road will run east out of Myitkyina to Tengchung (Tengyueh) and Paoshan in China's Yunnan Province. Called "Chiang's Lane," this barely jeepable trail carried driblets of supplies to China while the Bhamo area was still in Jap hands.

A Promise of May, 1942, Is Kept in January, 1945

The beginning of the road at the Ledo railhead lies north of the Naga Hills. Climbing, dipping, twisting, the road runs eastward through the Patkai Range of northern Burma, weaves into the region of the upper Chindwin River, then angles southeastward through Burma's Hukawng Valley to Mogaung. There a right-angle turn to the east brings the road to Myitkyina, hub of all Upper Burma.

Men of many nations, tribes, military outfits, and construction units worked on the job night and day. Semi-wild Kachins and Nagas (illustration, cover) did their bit. Chinese workers cleared the way, felled trees, opened the jungle. U. S.

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Richard H. Stewart

MAY DAY IS LEI DAY IN HAWAII THE MAYPOLE DANCE IS REPLACED BY THE TRADITIONAL HULA OF THE ISLANDS

These prewar Honolulu schoolgirls are celebrating Lei Day with an elaborate hula. This festival is a gay and flowery version of May Day (with which it rhymes). On a flower-decked dais before the Iolani Palace sits the Lei Day Queen, surrounded by her courtiers. The tall poles with their flowerlike tops represent the ancient feather *kahilis* that were part of the pomp and ceremony of old Hawaii's kings and queens. Instead of the usual raffia "grass" skirt of the tourist trade, the dancers wear a fringe of green leaves from the banana plant, the ti plant, or the palm. They are crowned with varied island flowers —carnations, plumeria, ginger, lehua, and wreathed with leis of hydrangeas, roses, gardenias, or ilima. Small bouquets of flowers adorn their ankles. They sway in graceful undulating motions like the waves of the seas that wash their islands. Hawaiians celebrate all mainland United States holidays and have added several of their own. Lei Day is one of the newest and gayest. On this festival everyone, instead of only a fraction of "everyone," wears a lei of flowers around his neck (Bulletin No. 3).

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Suffering Finnmark Is First Norway Province to Oust Germans

AMID reports that Germany will soon be forced to abandon all Norway, it should not be forgotten that most of Finnmark, the northernmost province of that far-north country, has already been freed from the Nazis. Soviet troops, driving westward from Finland's former Arctic port of Petsamo, took Kirkenes last October. In January they were joined by a Norwegian patriot army assembled in England.

This good news has been clouded by continuing reports of German atrocities against the civilian population of the area. As they withdrew before the Allies, the invaders destroyed villages and homes and drove the freezing inhabitants before them in what they termed a "satisfactory" evacuation.

Finnmark at Latitude of Northern Alaska

To be homeless in Finnmark is to be hopeless. The country offers little shelter. Only hardened, nomadic Lapps can survive in the interior. Some Norwegian fishing villagers turned to their old friend, the sea, and escaped in their boats. Refugees from Alta, one of the largest ports, reported that only 150 persons, of a prewar population of 1,500, remain in the devastated town.

Finnmark, in peacetime a thriving region, lies in the latitude of Point Barrow, Alaska. The Gulf Stream, warming the Norway coast, makes it habitable, whereas northern Alaska is a barren waste. From the end of November to the middle of January, the people of Finnmark do not see the sun. At this time of year it peeps above the horizon for a short time at noon. In the summer, however, the sun remains above the horizon constantly for two and one-half months.

The eastern part of the province is largely tableland of low elevation which drops suddenly down to the sea. Most of the mountains of far northern Norway rise abruptly from the sea. Fishing and trading stations—Kirkenes, Vardö, Tana, Alta, Hammerfest (illustration, next page)—for the most part cling to the steep shores of fjords. Temperature on the coast is usually above freezing, but inland winter temperatures may drop to 49 degrees below zero, Fahrenheit.

To Norwegians, Lapps Were Finns

Finnmark comprises roughly all of Norway lying north of Finland. It extends east from near the Kvaenangen Fjord on the Arctic Ocean for a total area twice that of New Hampshire. The province is peopled largely with Lapps.

Finnmark means "field of the Finns." Lapps were confusingly called Finns by the Norwegians. Lapland stretches over parts of four countries—Norway, Sweden, Finland, and the Soviet Union.

Many Lapps are fishermen, normally engaged in cod-fishing in the stormy seas off the Lofoten Islands. They also fished off their own Finnmark coast, catching cod on baited lines from 10-oared boats.

Inland the tent-dwelling Lapps followed their herds of reindeer, principal source of food and clothing. Reindeer also drew their sleds. Other Lapps, non-nomadic tribes, lived in the forests, growing potatoes in clearings and fishing the lakes and rivers. In peacetime many went to the island of Spitzbergen to hunt polar bear, Arctic and blue fox, and wild reindeer.

The Lapps normally traded furs, reindeer meat, walrus tusks, and fish for flour, butter, sugar, salt, tobacco, and other imported needs.

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Army Engineers, in charge of the whole job, blasted out rock and earth, built temporary bridges, and got traffic rolling before final grading, surfacing, and drainage were completed.

While the road was taking shape, men and supplies for China were flown over the Himalayan "hump" by the Air Transport Command. But since the Japs took Lashio in May, 1942, stopping Burma Road traffic, virtually all surface contact between China and its American and British allies has been cut off. The truck fleet that rolled past Wanting and into China, last month, was the first notable ground supply unit to reach China in more than two and one-half years of desperate national siege. Fitting ceremonies marked the occasion.

One of the first things the men of the convoy did when they reached Wanting was to erect a sign, in English and Chinese, which read in part: "The first convoy over the Ledo Road passed this point today, Jan. 28, 1945, thus establishing a land route to China from India. . . . With the opening of this road America is implementing her promise, made to China in the dark days of retreat, to give our Allies the means to victory."

Chinese troops, which had just finished the job of clearing the last die-hard Japs from the road, gave the Mei Kuos (Americans) the thumbs-up sign and shouted "Ting hao!" as the convey passed. This congratulatory exclamation means "Very, very good," but in the coinage of the Ledo Road it has become an international greeting readily adopted by the Yanks.

Chinese and Burmese onlookers at Wanting cheered wildly as the first jeep, carrying General Pick, rode into China through a bamboo gateway festooned with V's and inscribed with "Welcome" in Chinese.

Note: The route of the Ledo Road may be traced on the National Geographic Society's Map of Southeast Asia, a supplement to the October, 1944, issue of the *National Geographic Magazine*. A price list of maps will be sent on request to the Society's headquarters, Washington 6, D. C.

See also, "Manipur—Where Japan Struck at India" (11 illustrations and a map), in the *Magazine* for June, 1944; "Burma: Where India and China Meet," October, 1943*; and "Burma Road, Back Door to China," November, 1940*. *(Issues marked with an asterisk are included in a special list of magazines available to teachers in packets of ten for $1.00.)*

U. S. Army Signal Corps

THE AMERICAN GENERAL GAVE THEM A NEW ROUTE TO THE OUTSIDE WORLD

General Joseph W. Stilwell, after losing control of the Burma Road during his retreat from the Japanese in 1942, immediately began planning a new road to link China to India. Generalissimo and Madame Chiang Kai-shek, here sharing a pleasant moment with General Stilwell, dispatched Chinese troops and workers to help their allies clear north Burma of the Japs and to assist in building the just-completed Ledo Road. Now Chiang suggests that the new highway be called the Stilwell Road.

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Hawaiian Islands: a Bridge to Far Pacific Battle Fronts

FOR most Americans, the discovery of the Hawaiian Islands dates from December 7, 1941. Actually these mid-Pacific isles have been a part of the United States for nearly half a century. They were first seen by white men while the American Colonies were fighting for their independence from England. James Cook, the British sea captain who discovered the group, named them the Sandwich Islands in honor of the 4th Earl of that name who was then Britain's First Lord of the Admiralty. However, the natives' name for the islands, Hawaii, persisted.

Until the Pearl Harbor attack the average "mainland" American thought of the islands chiefly as a distant possession rather than as an actual part of the United States, which, as a territory, they have been since 1900. The name Hawaii suggested soft breezes rustling palm trees, surf breaking on sunlit sands, wailing ukeleles, happy natives (illustration, inside cover), pineapples, and blazing volcanoes.

A "Paradise" Becomes a "Bridge to the Orient"

At Pearl Harbor the Japs temporarily scuttled the "Paradise" idea, along with United States battleships—which came back to help defeat them in the Second Battle of the Philippine Sea. In place of the idyllic title, such names as "Crossroads of the Pacific" and "the Nation's Bridge to the Orient" have come to the fore.

The Hawaiian Islands spread 1,700 miles, southeast to northwest, across the central Pacific. Somewhat larger than Connecticut and Rhode Island combined, 99.9 per cent of their 6,500 square miles is in eight inhabited islands in a 400-mile reach at the chain's southeast end. A dozen islets, totalling not more than six square miles, complete the archipelago.

Hawaii (4,021 square miles), Maui (728 square miles), Oahu (600 square miles), Kauai, Molokai, Lanai, Niihau, and Kahoolawe are the eight main islands in size order. All are lush, beautiful, and mountainous—tops of great volcanoes rising from the deep ocean floor. On Oahu, by far the most important of the group, are the chief Army and Navy installations as well as the capital city, Honolulu. On Oahu live three-fifths of Hawaii's prewar population of 423,000 people.

Kure atoll, at the chain's northwestern end, is 2,200 miles east of Japan. From Honolulu, it is 2,395 miles to San Francisco; 3,850 miles to Tokyo; and 5,300 miles to Manila.

Only on the Island of Hawaii are volcanoes still active. There the eruption of molten lava from Kilauea and other craters on Mauna Loa has been an awesome spectacle for hordes of Uncle Sam's fighters. Mauna Loa, 13,680 feet high, is the world's mightiest active volcano and largest island mountain. Hilo, second city and commercial port in the Islands, with 23,000 people, lies 25 miles northeast of Kilauea, under remote threat of a fate similar to Pompeii's.

Sugar and Pineapples Teamed to Promote Hawaii's Prosperity

Dormant volcano peaks, such as snow-capped Mauna Kea north of Mauna Loa and 8,000-foot Hualalai, lend majesty to Hawaiian scenes. Forests are tangled with flowering plants and vines, ferns grow in green luxuriance from an inch long to the height of a tall tree. Short, swift streams plunge over cliffs in misty waterfalls. Miles of sugar cane grow in green waves between mountains and sea. Gray-green rows of pineapple plants stripe the red soil of the uplands. Cattle ranches sprawl for miles over the slopes of dead volcanoes.

The climate of the islands approaches man's ideal. Winter temperatures rarely go below 60 degrees, Fahrenheit; the summer maximum is 88. Responding to climate, soil, and scientific methods, sugar cane reaches peak production per acre on the islands. Prewar raw sugar volume reached a million tons a year. The industry employed 50,000 people, and shaped Hawaii's prosperity. It was the foremost factor in building America's Pacific merchant fleet.

Pineapple makes the No. 2 industry. An annual volume of 300,000 tons of canned fruit and juice was turned out by 25,000 workers before the war. Thriving on dry uplands to 2,000 feet, the pineapple teams well with sugar cane, which grows best on flat, well-watered lowlands.

The tourist trade ranked next. Cattle-raising and coffee-growing held high places in this rich agricultural empire. The argument for statehood, favored 2 to 1 in a 1941 referendum, was pointed up by the facts that the Islands exceed eight states in population, 12 states in annual tax payments to the Federal treasury, and normally spend more on the "mainland" (as Islanders call the continental United States) for food, clothing, and manufactured goods than does Mexico, Cuba, China, or any of the South American republics.

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Finnmark is the third most important forest area in Norway, with spruce and fir forests extending along the inland valleys of the Alt (or Altelv—*elv* meaning "river" in Norwegian), and along the Tana and Pasvik rivers. This timberland had been preserved not by conservation restrictions, but because of its distance from markets and the difficulties of transportation. However, fifty years ago, the government shut down on the export of timber from the province.

There is no timber on the many fjord-bound peninsulas or along the coast where the tundra is covered with grasses and sedges. During the summer's short but intense growing season bright flowers and berries grow in abundance. Wild forget-me-nots and similar meadow flowers which grow only knee-high in south Norway attain man-size heights along the fjords of Finnmark.

Note: The Finnmark region of Norway may be located on the Society's Map of Europe and the Near East, and on the Map of the Union of Soviet Socialist Republics.

For additional information, see "Norway, an Active Ally," in the June, 1943, issue of the *National Geographic Magazine;* "The Nomads of Arctic Lapland," and "Europe's Northern Nomads" (12 color photographs), November, 1939*; and "Country Life in Norway," April, 1939*; and, in the GEOGRAPHIC SCHOOL BULLETINS, January 15, 1945, "Allies in Europe: 2. Norway."

Bulletin No. 2, February 19, 1945.

De Cou from Galloway

HERE, WHERE LIFE AT BEST WAS HARD, THE GERMAN JUGGERNAUT ALL BUT CRUSHED IT OUT

This is Hammerfest before the war—a Finnmark fishing port just south of Nordkapp (North Cape) where hardy Norwegians endured a molelike existence through the sunless winter in return for a busy summer's "day" of two and one-half months. Bare hills stretch into the interior where a few Lapps live. The only contact with south Norway is by sea and one tenuous road. Though Hammerfest at press time had not been liberated, there remained little to liberate. According to reports from the Norwegian Embassy in Washington, all these buildings, except one or two which the few remaining Germans are still using, have been destroyed. The townspeople were forcibly evacuated and driven like cattle before the retreating Nazis. In all Finnmark only one-fifth of the population is left.

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V-2, Germany's Rocket Bomb, Borrowed U. S. Designs

MANY points were cleared up recently when the British Air Ministry released information on V-2, a German vengeance bomb. Drawings, showing the heretofore "secret" parts of the rocket bomb which hurtles erratically onto England from heights of 60 miles or more, reveal a strange similarity to rockets developed in the United States before the attack on Pearl Harbor.

So closely do the mechanical features of V-2 parallel the American projectile that some physicists think the Germans may have actually copied most of the design.

Experiments, 1910; Patents, 1932; Results, 1944

The extensive research that resulted in the United States rocket was carried on by Dr. Robert H. Goddard, one of America's outstanding rocket experts. In more than 30 years devoted to rocket experimentation, Dr. Goddard worked under the auspices of Clark University, the Smithsonian Institution, and the Daniel and Florence Guggenheim Foundation.

When Dr. Goddard started his experiments about 1910, rockets had progressed little beyond the "Fourth of July" type. Discarding gunpowder, Dr. Goddard selected liquid oxygen and gasoline as the driving force. He designed a scientifically-shaped combustion chamber which "squeezed" the escaping gases and extracted from them greatly increased pushing power. He introduced jet-driven centrifugal pumps to feed the fuels under great pressure; and evolved a pilot gyro, connected with vanes near the tail of the rocket, which stabilized and controlled its flight.

Most of these features were patented by Dr. Goddard between 1914 and 1932. V-2 parts captured in Belgium and reconstructed in England contained all of the elements of Dr. Goddard's rocket, and even their arrangement inside the shell was the same. The few minor differences included the use of alcohol in place of gasoline and a slightly different method of cooling the walls of the combustion chamber. The American rocket did not have an explosive head, but patent drawings by Dr. Goddard as early as 1914 indicated the possibility of using the projectiles to carry explosive charges.

The Shotgun's "Kick" May Reach the Moon

The "rocket action" which Dr. Goddard built up from a puny strength to one of giant might is a matter of simple recoil. It is the same force which causes a shotgun to kick backward against the shoulder at the same time that the exploding cartridge sends its bullets forward from the smooth gun barrel. In this case the main force is forward and the recoil is an unwanted by-product.

Dr. Goddard's inventions succeeded in reversing this situation and in making the recoil more and more efficient and powerful. One of the fundamental steps was the proper designing of the combustion space. The power of the backward thrust was increased further by the use of liquid fuels which expand tremendously in passing from the liquid to the gaseous form. The force was still further heightened by the action of the fuel pumps.

These developments brought astounding results in total power output. The largest American-made rocket model following this design was only 21 feet long and 18 inches in diameter, charged with approximately 250 pounds of fuel; yet

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Honolulu, with about 180,000 people before the influx of service hordes, is a melting pot, up-to-date, typically American. Modern stores, banks, and office buildings, movie theaters, the Territorial Library; less modern hotels, and the historic Iolani Palace—once home of kings and queens and now housing the Legislature—occupy the narrow strip between the harbor and the city's backdrop of steep, green mountains. Streetcars run along wide boulevards to Waikiki Beach, where resort hotels and cottages dot the palm-bordered shore curving southeast to Diamond Head. Honolulu's churches and temples represent religions as varied as the personnel of the Legislature, which currently has 20 Caucasians, 7 Portuguese, 6 Hawaiians, 5 Japanese, and 4 Chinese—all American citizens working together.

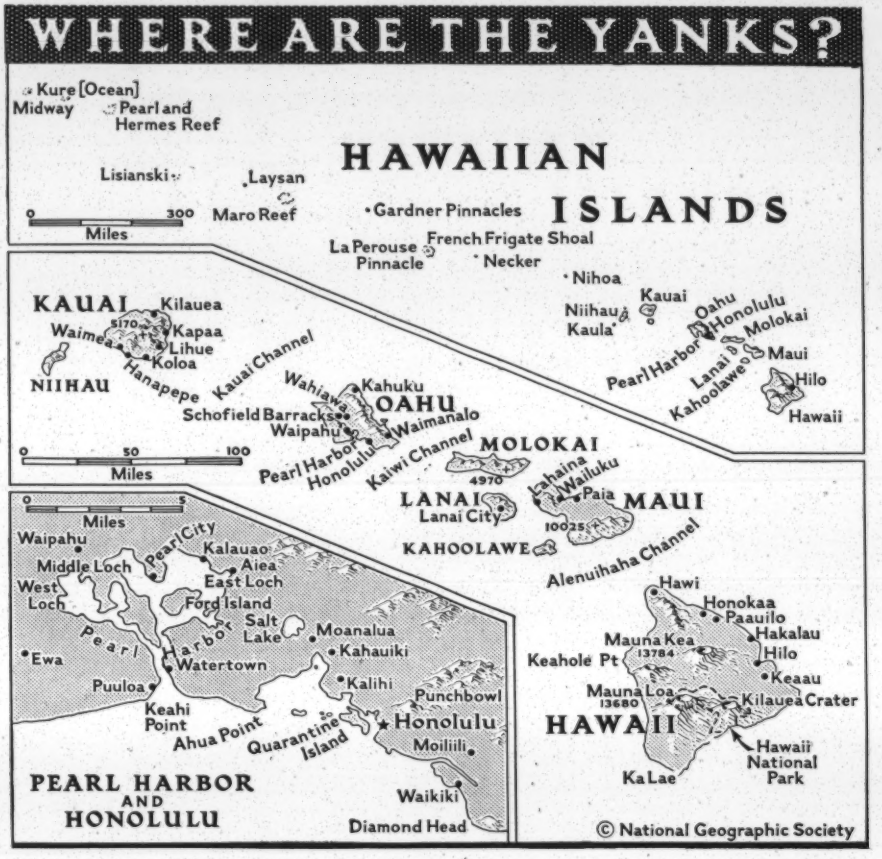
People of Japanese extraction comprised over one-third of Hawaii's 1941 population. Some espionage took place prior to Pearl Harbor, but few Jap aliens were interned. Virtually all residents have worked hard to support the Allied cause. Loyal Japanese-Americans fighting with General Clark's 100th Infantry in Italy have won high honors for heroism.

Recognizing Hawaii as an American Gibraltar, the Government developed the great natural naval base at Pearl Harbor, a few miles west of Honolulu; Schofield Barracks, the huge Army post 8 miles inland on the Plains of Leilehua; and airfields and Army posts at strategic points in the Islands. Hawaii today is very busy with war, and ready for peacetime expansion of Pacific trade and trade routes by sea and air.

Note: The Hawaiian Islands are shown on the Society's Map of the Pacific Ocean and the Bay of Bengal, on which they appear in a large-scale inset.

See also "Life on the Hawaiian Front," in the *National Geographic Magazine* for October, 1942*; and "Hawaii, Then and Now," October, 1938*; and "Hawaiian Islands at Pacific Crossroads," in the GEOGRAPHIC SCHOOL BULLETINS, April 13, 1942.

Bulletin No. 3, February 19, 1945.



AN AREA SMALLER THAN MASSACHUSETTS DOTS 1,700 MILES OF THE PACIFIC

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Geo-Graphic Brevities

FLORENTINE LIBRARY STIMULATED REVIVAL OF LEARNING

WAR has prevented observance of the 500th anniversary of the founding of the Laurentian Library of Florence, Italy, in 1444-5. One of the outstanding monuments of the Renaissance, it was established by Cosimo de' Medici and was the inspiration for the establishment thirty years later of the Vatican Library.

The library was originally housed in the Palazzo Medici. In 1524 construction was started on the cloisters of San Lorenzo and the adjoining building where the library was to be permanently installed.

Before the present war the Biblioteca Laurenziana, or the Laurentian Library (named for Lorenzo the Magnificent, grandson of Cosimo), housed 10,000 prized manuscript books, mostly copied by monks in pre-printing days. Preserved there also were many illuminated (hand illustrated) volumes. These were chained at steep angles to hand-carved reading-desks designed by Michelangelo.

The Renaissance had its beginnings in Florence as a revival of learning, a renewal of interest in the works of early Latin and Greek authors. Petrarch, reputed founder of the movement, began the collection of ancient manuscripts, a mania that seized all Italy and gradually swept over Europe. Practically all extant Greek and Latin literature was recovered between 1350 and 1450.

Constantinople and Eastern monasteries furnished most of the Greek works, while the Latin books were found largely in the vaults of old Benedictine monasteries of Italy, France, Switzerland, England, and Ireland. Founded at Monte Cassino in 1529, the Order of St. Benedict made the copying of manuscripts the principal industry of the monks.

Cosimo de' Medici began collecting these ancient works in 1439. He acquired Niccolo di' Niccoli's collection of several hundred manuscripts, some of which he placed in the library of the San Marco Convent, others in the library of Fiesole, which he also founded. He had 45 copyists working two years to produce additional volumes for the Abbey of Fiesole. The contents of these libraries, with Cosimo's personal collection, went into the founding of the Laurentian Library.

It early became the outstanding collection of the Renaissance, including the original vellum manuscripts of Petrarch's works, with the well-known portraits of Petrarch and Laura; and the manuscript copy of the *Decameron* of Boccaccio, disciple of Petrarch. It housed Benvenuto Cellini's autobiography, the writings of Michelangelo, and originals of other priceless literary gems.

By 1571, when the library was acquired by the city and thrown open to the public, it already had 3,000 rare manuscripts. It received many previously suppressed books from the monasteries of Italy.

* * * * *

WARSAW'S INDOMITABLE SPIRIT STILL LIVES

WARSAW (Warszawa), pride of Poland, is in ruins, a symbol of ruthless modern German warfare. Yet reports from the Polish capital indicate that the spirit of its people, though dimmed, still lives.

When the Germans were driven from the city recently, it was deserted. But the population already is slowly swelling. The nucleus of the present population is a group that went into hiding when other residents were herded off to Germany.

They moved in as the Germans moved out. Chalked slogans appeared on

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it is estimated that its flaming, outsurging gases delivered a horsepower equal to that of a steam locomotive. The German V-2 rocket, in effect an expansion of the American model, weighs approximately 12 tons, 9 tons of the weight being fuel. It therefore develops a tremendously greater power.

Most of Dr. Goddard's experiments between 1930 and 1941 were carried on near Roswell, New Mexico. In the open country near by he erected a launching tower. Numerous flights were made, usually to a height of several thousand feet. The mechanisms were saved from damage and returned to earth by the opening of automatic parachutes.

Experiments with Step Rocket

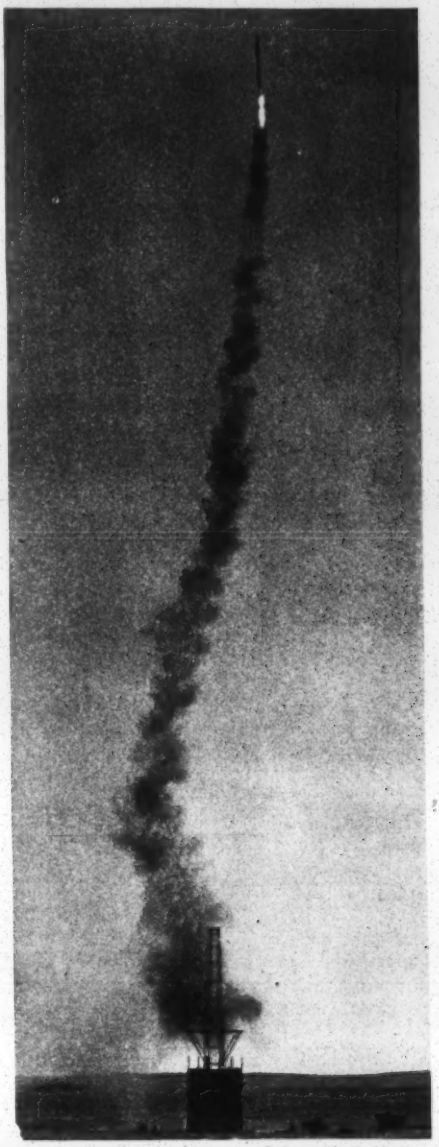
Because the United States, unlike Germany, had no enemy whose territory could be reached by short- or medium-range rocket bombs, the Army and Navy in 1941 requested Dr. Goddard to suspend his rocket experiments and devote all his time to jet-propelled airplanes.

Dr. Goddard also studied the "step" rocket, which may some day travel in Buck Rogers fashion thousands of miles across oceans or upward even beyond the earth's atmosphere. The step rocket is a series of rockets "nested" together. The heaviest and most powerful of the units would be fired first to get the projectile under way. After the fuel of the first rocket was exhausted, it would drop away, first igniting the second rocket which would push the group on, taking full advantage of the momentum already attained. This procedure would continue with the smallest rocket coming into operation only after it had been driven thousands of miles from the starting point.

It is this type of rocket which, according to rumors, German scientists threaten to fire from Europe to America.

Note: For further information on the development of modern weapons, see "Infantrymen—The Fighters of War," in the *National Geographic Magazine* for November, 1944; "Gliders—Silent Weapons of the Sky," August, 1944; and "Around the World with Your Soldier Boy," July, 1941*.

See the following GEOGRAPHIC SCHOOL BULLETINS: "Modern Tank Harks Back to Battering Ram" (Geo-Graphic Brevity), October 16, 1944; and "What Do You Know About Tanks?" November 23, 1942.



Robert H. Goddard

A "PEACE" ROCKET FLAMES SKYWARD

Germany developed its V-2 bomb as a weapon of terror and vengeance, but this prewar United States experiment with the same type of rocket projectile was for the scientific, peaceful purpose of recording temperatures and air pressures.

walls of demolished buildings. One read "We will rebuild you, dear Warsaw."

For nearly five years Warsaw has been methodically stripped and destroyed. In 1944 came a devastating blow when, after a rebellion in the city, German bombers and tiger tanks left ruin in their wake. Meanwhile Nazi forces blew up homes without warning to occupants. Soviet Russia reports that aged men, women, and children were killed by the thousands; some were buried alive.

Jan Bulhak

THE ROYAL PALACE IS A WAR CASUALTY, THE COLUMN A "PROBABLE"

Up to the time of the Warsaw patriot uprising of 1944 the column crowned with a statue of Poland's King Sigismund III was still standing. During and since that spontaneous outburst of captive Warsaw, the Germans perpetrated their most vicious acts of destruction.

Statues of Polish heroes that once adorned the city, including the cenotaph of the Unknown Soldier, have been marred or destroyed. Paintings and other art works from galleries and churches were ruined. Factories that were the lifeblood of thousands of workers were burned after equipment had been sent to Germany. Public utilities were wrecked, plunging streets into darkness and depriving the inhabitants of water.

Despite this, Warsawans insist "We will rebuild you, dear Warsaw." A Polish spokesman has demanded "not less than 150,000 German workers" to help reconstruct the city and restore all cultural monuments. A proposal has been made to raze what little remains of Warsaw and use German labor to build a completely new city capable of housing 3,000,000 people.

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